REMARKS

Claims 1-14 are pending in the application. An Office Action was mailed on May 13, 2004. In the present Response, Applicants amend claims 1, 6, and 7, and add new claims 15, 16. No new matter is added. Support for the amended and new claims may be found, for example, in Applicants' substitute specification at page 2, line 45 through page 3, line 12; page 7, line 12 through page 8, line 28; page 12, line 31 through page 14, line 25; and page 26, lines 1 - 9.

OBJECTED CLAIM

Claim 6 is objected to in regard to a minor typographical error. Applicants amend claim 6 to correct this error, and respectfully request that the objection to claim 6 be withdrawn.

REJECTION UNDER 35 U.S.C. § 103

Claims 1 – 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,038,233 to Hamamoto et al. in view of U.S. Patent No. 5,251,205 to Callon et al. Applicants amend claims 1 and 7 to further clarify the nature of their invention, and respectfully traverse this rejection.

In independent claims 1 and 7, Applicants respectively disclose a routing control method and apparatus for a routing control method in a mixed environment of a network of a first type and a network of a second type. The network of the first type and network of the second type are respectively defined by first and second address spaces, each having network-identifying and host-identifying portions. The network of the first type provides routing control by referencing a subset of address bits of the network-identifying portion of the first address space, and the network of the second type provides routing control by referencing an entirety of address bits of the network-identifying portion of the second address space. The claimed method includes the steps of:

a) assigning the network of the second type a virtual hierarchy number that corresponds to the subset of address bits of the network-identifying portion of the first address space and identifies the network of the second type as a network of the first type subordinate to a router for routing the packet to the network of the first type,

b) attaching the virtual hierarchy number to a packet to be relayed at the router when the packet is to be relayed between the network of the second type and the network of the first type,

c) performing routing control by the virtual hierarchy number within the network of the first type, and

d) removing the virtual hierarchy number from the packet to be relayed at a the router when the packet is to be relayed between the network of the first type and a network of the second type.

In a Response of April 20, 2004, Applicants made the following arguments:

Hamamoto discloses a translator for coupling traffic between an IPv4 network and an IPv6 network (see, e.g., FIG. 1 of Hamamoto). Hamamoto appears to teach the IETF mapping format as illustrated in Applicants' Fig. 8. In this format, an IPv4-compatible IPv6 address is produced by placing the IPv4 address in the 32 low-order bits of an IPv6 packet, and inserting zeros in each of the 96 high-order bits of the packet. This can be contrasted with the approach disclosed by Applicants (illustrated, for example, in Applicants; FIG. 10), in which the IPv4 address is included in the 64 low-order bits reserved by the packet for the IPv6 interface ID, and a virtual hierarchy number, for example, is included in a 16-bit SLA ID field of the packet.

The Examiner acknowledges that Hamamoto fails to expressly teach assigning the IPv4 network a virtual hierarchy number corresponding to the network-identifying portion of the IPv6 network, and asserts that Callon teaches this limitation.

Callon discloses a multiple protocol routing method, including encapsulating a packet of protocol A within a data portion of a packet of protocol B in order to transfer the protocol A packet over a protocol B network (see, e.g., column 3, lines 13 – 41 of Callon). In our Response of October 7, 2003, we made the following argument with regard to Callon (identified as "Callon I"):

This approach is quite distinct from Applicants' claimed approach. In Applicants' claimed method, a data packet for a network of the second type is not <u>encapsulated</u> in a data packet for a network of the first type, but rather an

address of the data packet of the second type is <u>altered</u> to conform to an address space of the network of the first type. In this manner, the packet for the network of the second type is assigned an address of the first type of network having a virtual hierarchy number which effectively identifies a portion of the network of the first type at which the network of the second type is interfaced via a router.

Applicants' invention enables efficient routing of the packet from the network of the second type within the network of the first type by employing an address scheme used by the network of the first type to reduce the number of address bits required for routing. In comparison to Callon I, Applicants' approach avoids the level of overhead that would be incurred by fully encapsulating a packet of the second type within a packet of the first type according to the approach of Callon I. Moreover, like Callon II and Gilligan, Callon I fails to suggest or disclose Applicants' claimed virtual hierarchy number that both corresponds to the <u>subset of address bits of the network-identifying portion</u> of the first address space, and identifies a <u>portion of the network of the first type at which the network of the second type is interfaced</u> via a router.

For example, at column 3, lines 42 – 47, Callon cites as a disadvantage of encapsulation that "the gateway must be manually configured, and thus must also be manually maintained. If a change to the gateway path is desired, or if an additional gateway path is added, the gateway routers must be manually adjusted to affect the desired changes." This implies that the encapsulant protocol contemplated by Callon is one is associated with a network of the "second type" in which a variety full path addresses are mapped to the gateway, rather than a network of the "first type" in which a single portion of the routing address is sufficient to identify the router.

The Examiner found these arguments to be unpersuasive, suggesting that in combination Hamamoto and Callon suggest translating an IPv4 packet to an IPv6 packet by placing the IPv4 packet in an IPv6 packet format having a header containing a virtual hierarchy number of the IPv6 network. The Examiner suggests that this specific addressing scheme is made obvious in light of Callon teaching "that it is well known to treat a network of a first protocol type as a virtual extension of a network of a second protocol type through the use of encapsulation".

Applicants thank the Examiner for participating in an interview with Applicants' representative on August 5, 2004 to further discuss the nature of Applicants' claimed invention. In this interview, Applicants' representative argued that Hamamoto and Applicants essentially teach an address <u>conversion</u> and routing method that is distinct from the <u>encapsulation</u> method

disclosed by Callon, and that there is accordingly insufficient motivation for combining the references.

Applicants' representative further argued that neither Hamamoto nor Callon teach Applicants' claimed virtual hierarchy number that both corresponds to the subset of address bits of the network-identifying portion of the address space of the second protocol type, and identifies a virtual portion of the network of the second protocol type at which the network of the first protocol type is interfaced via a router. Thus, even assuming sufficient motivation to combine the two references, the combination would still fail to teach or suggest Applicants' claimed virtual hierarchy number. Rather, the combination of Hamamoto and Callon would suggest routing in the hierarchical network by means of addresses based on existing hierarchy numbers in the hierarchical network. In contrast to the disclosed references, by means of the virtual hierarchy number, Applicants' claimed method and apparatus transforms the non-hierarchical network into a unique sub-network of the hierarchical network (i.e. subordinate to the router for routing to the hierarchical network).

In an interview summary of August 6, 2004, the Examiner summarized the interview results as follows:

> Applicant stated that the combination of Hamamoto and Callon does not disclose all of the limitations of the claims since the combination does not teach that the IPv4 network is treated as a sub-network of the IPv6 network. Examiner states that the claims do not specify that the IPv4 network is treated as a sub-network of the IPv6 network. Instead, the claims only state that the IPv4 network is assigned addresses corresponding to addresses in the IPv6 network. Examiner maintains that such limitations are found in the combination.

Accordingly, and at the Examiner's suggestion, Applicants amend independent claims 1 and 7 to recite that the "network of the second type [is assigned] a virtual hierarchy number that corresponds to the subset of address bits of the network-identifying portion of the first address space and identifies the network of the second type as a network of the first type subordinate to a router for routing the packet to the network of the first type". Support for this amendment may be

found, for example, in Applicants' substitute specification at page 2, line 45 through page 3, line 12; page 7, line 12 through page 8, line 28; and page 26, lines 1 – 9.

Accordingly, Applicants respectfully submit that the combination of Hamamoto and Callon fails to teach or suggest the amended limitation, and that amended independent claims 1 and 7 therefore stand in condition for allowance. As claims 2 – 6 and 8 – 14 each respectively depend from one of allowable claims 1 and 7, Applicants further submit that claims 2 – 6 and 8 – 14 are allowable for at least this reason.

CONCLUSION

An earnest effort has been made to be fully responsive to the Examiner's objections. In view of the above amendments and remarks, it is believed that claims 1 – 16, consisting of independent claims 1, 7, 15 and 16, and the claims dependent therefrom, are in condition for allowance. Passage of this case to allowance is earnestly solicited. However, if for any reason the Examiner should consider this application not to be in condition for allowance, he is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged on Deposit Account 50-1290.

Respectfully submitted,
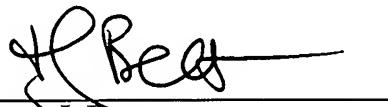
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